

**FINAL DRAFT
2/9/07**

Bliss Nitrate Priority Area

Ground Water Quality Management Plan



**This plan meets the requirement set forth in
Policy PM00-04 to address the Bliss area of concern.**

Table of Contents

SECTION 1: BACKGROUND	7
SECTION 2: MANAGEMENT PLAN GOALS	9
SECTION 3: MANAGEMENT PLAN APPROACH	9
SECTION 4: MANAGEMENT PLAN OBJECTIVES	10
SECTION 5: STRATEGIES FOR IMPLEMENTATION	10
SECTION 6: PROBLEMS AND RECOMMENDATIONS	11
SECTION 7: IMPLEMENTATION TASKS	12
SECTION 8: EVALUATION OF MANAGEMENT PLAN PROGRESS AND SUCCESS	13
SECTION 9: RESPONSIBILITIES	14

Tables

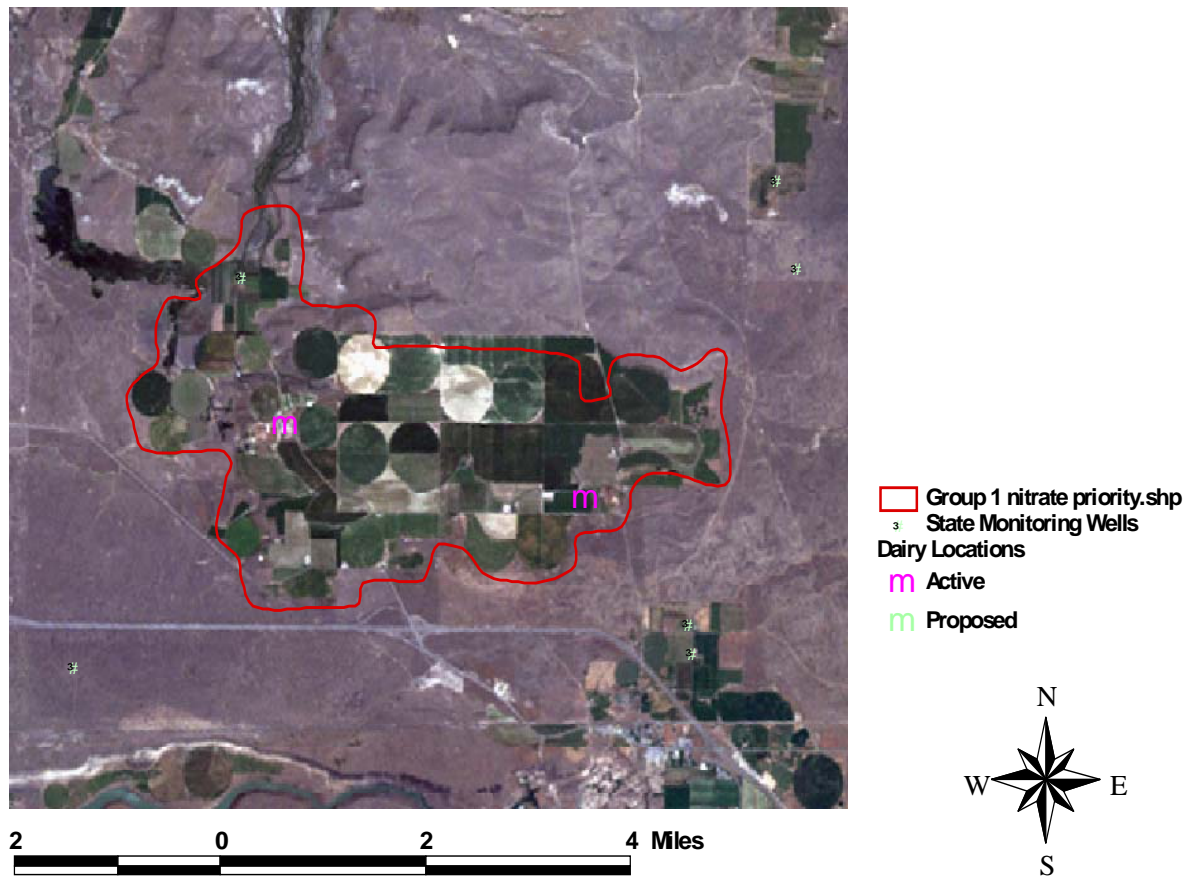
Table #1: Problems and Recommendations.....	10
Table #2: Implementation Tasks.....	11

Figures

Figure #1: Group 1 Nitrate Priority Areas.....	3
Figure #2: Bliss Nitrate Priority Area.....	4

Figure
#1

Bliss Nitrate Priority Area



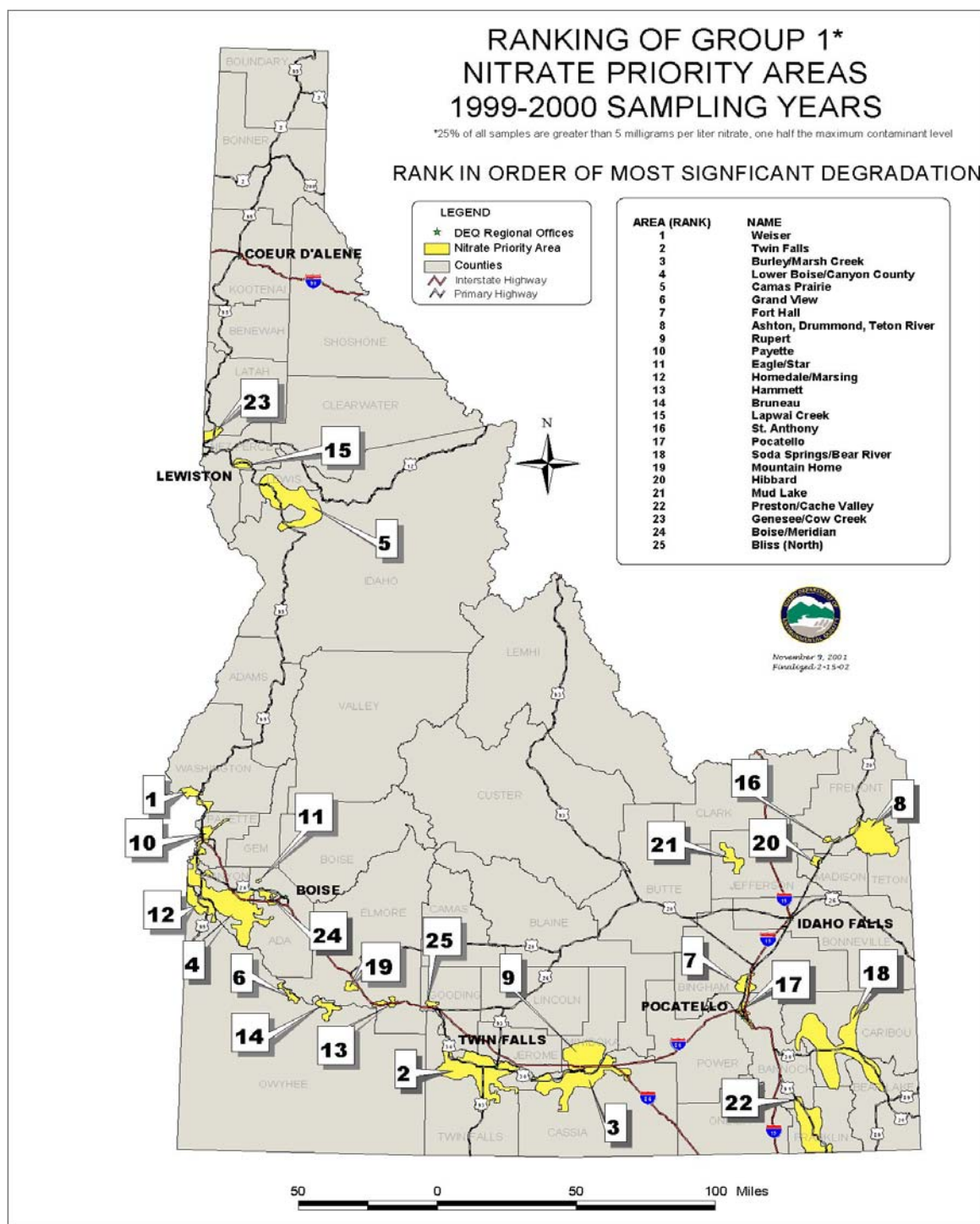


Figure #2

EXECUTIVE SUMMARY

Ground water monitoring results in the Bliss area have shown elevated levels of nitrates. The Idaho Department of Environmental Quality (IDEQ), the Idaho Department of Water Resources (IDWR) and the Idaho State Department of Agriculture (ISDA) agree that nitrate¹ is the most widespread preventable ground water contaminant in Idaho and that the problem is increasing in extent and severity. Over 95% of the drinking water consumed in Idaho is supplied by ground water and because this resource is so vital, strategies that eliminate or minimize nitrate contamination in the environment are critical.

Elevated nitrate levels can pose a health problem in both humans and animals. It can also be an indicator of other water quality problems. Nitrate levels tend to increase when contaminants, such as fertilizer, livestock manure or septic waste reaches a water supply. Approximately 3% of Idaho's wells sampled through the Ambient Statewide Ground Water Quality Monitoring Program have nitrate-nitrogen concentrations exceeding the federal drinking water Maximum Contaminant Level (MCL). Another 30% of Idaho's wells have impacted levels of nitrate between 2 and 10 mg/l (Neely and Crockett, 1999). Within the Bliss Nitrate Priority Area approximately 39% of the sampled wells contained nitrate concentrations greater than 5 mg/L.

The federal regulatory level for nitrate concentration in human drinking water is 10 milligrams per liter (mg/l). This standard is based on studies assessing the risk of developing methemoglobinemia or "blue baby syndrome" in infants as a result of exposure to nitrates. Nitrate levels above this regulatory level have been associated with methemoglobinemia, which is the inability to absorb oxygen in the blood system. Methemoglobinemia is usually discussed with respect to risk in newborns and infants up to 6 months of age. However, adults with reduced stomach acidity, and people deficient in a particular enzyme, are also at risk. Several studies are underway to explore the possible link between long-term exposure to elevated nitrates and the incidence of health problems such as non-Hodgkin lymphoma, miscarriages, diuresis and hemorrhaging of the spleen. High-nitrate water is generally a health hazard to animals only when used with high-nitrate feed. Short-term use of water up to 40 mg/l nitrate is generally considered acceptable for animals.

The Idaho Department of Environmental Quality (IDEQ) formed the Ground Water Monitoring Technical Committee to compile the state's ground water nitrate data. This committee delineated and identified twenty-five areas with elevated nitrate using ground water data collected through 2000. Each of these areas had 25% or more of the sample wells exceeding 5 mg/l nitrate. These twenty-five areas (see Figure #1 A) were then ranked to determine the severity of the nitrate problem and to establish a work priority for agency resources. These areas are considered critical in terms of ground water nitrate contamination by IDEQ. Ranking criteria consisted of population, existing water quality, water quality trends, and beneficial uses. The Bliss Nitrate Priority area was placed as #25 on this Nitrate Priority list.

¹ In this document, whenever the term "nitrate" is used, it refers to the more scientifically correct term "nitrate as nitrogen" or "nitrate-nitrogen"

To address this issue, The IDEQ formed a stakeholders group that includes, Gooding Soil Conservation District (SCD), Idaho State Department of Agriculture (ISDA), local producers/land owners operating within the delineated Bliss Nitrate Priority Area (BNPA), Middle Snake Regional Water Resource Commission (MSRWRC) and the Gooding County Commissioners to design and implement a management plan that will reduce current nitrate levels and prevent future nitrate level increases.

This plan is intended to be a “Best Management Practice” tool, not an enforcement tool. It is intended to provide direction and guidance to operators/landowners within the BNPA to protect both ground water and surface water from nutrients (in particular nitrates), pesticides and other contaminants.

At this time, adoption of this plan is strictly voluntary. The IDEQ will continue to compile and analyze ground water monitoring data collected by all the state agencies. The effectiveness of this voluntary plan will be evaluated, and possible changes may be initiated depending upon results. If improvements to ground water nitrate concentrations are noted, then regulatory intervention may be avoided.

If ground water quality objectives are not met due to inadequate implementation of best management practices, best practical methods, or other corrective or preventive measures, then regulatory actions as authorized by law may be pursued as set forth in the Ground Water Quality Rule IDAPA 16.01.11.350.01 and 02.

IDEQ and cooperating entities identified land use activities and practices that could potentially affect nitrate levels in local ground water, springs and surface water. In addition to regulations currently in place, “Best Management Practices” (BMPs) for some activities/practices will be provided in this document. These activities can be summarized as follows:

- Implementation of Best Management Practices in Nutrient Management Planning.
- Implementation of Best Management Practices in Irrigation Management.
- Evaluate effectiveness of existing Best Management Practices related to animal waste materials and provide technical assistance, as needed to dairy and CAFO operations in the BNPA
- Identify and establish additional ground water quality monitoring sites to better characterize nitrate contamination and nitrate concentration trends.
- Water Quality Monitoring and Evaluation of BMP Effectiveness in reducing nitrate loading to both ground water and surface water.
- Protect public health and welfare.

SECTION 1: BACKGROUND

Nitrate (NO₃⁻) is one of the chemical forms of nitrogen. It coexists with other forms of nitrogen in a complex cycle and can originate from atmospheric deposition, application of fertilizer, manure, waste material and dead plant and animal tissue. In most natural systems, inorganic nitrogen is a scarce nutrient and plants efficiently use that available nitrate minimizing any losses to ground water and surface water. In agricultural systems, nitrate is added to increase yield and production of non-legume crops and it may be present in amounts exceeding what plants are able to use. As a result, excess nitrate can leach into ground water or be washed into surface water.

In 1999-2000, The Department of Environmental Quality analyzed ground water data from around the state with a focus on nitrate. Areas within the state were then placed on a Nitrate Priority Area list. Scores were formulated based on population, ground water quality, the trend of the nitrate analysis and other beneficial uses of the ground water. The Bliss Nitrate Priority area was ranked 25, out of 25 areas of concern.

Failure to act and improve ground water quality can result in higher costs to public water systems if treatment becomes necessary to meet safe drinking water standards. These costs would be passed on to the consumer. Additionally, private well owners may need to treat their water if they want to meet those same standards.

The Bliss nitrate priority area encompasses 6,800 acres of irrigated agricultural land overlying the Eastern Snake River Plain Aquifer north of the City of Bliss and Interstate 84. Crops grown within the area include alfalfa, wheat, corn, beets, beans and potatoes. The area encompasses one dairy operation (1,200 – 1,500 head), one CAFO (approximately 500 head, heifer replacement operation) and rural housing.

Monthly ground water monitoring over a seven year period 1999 – 2006 indicates that nitrate-nitrogen has contaminated local ground water resources. This year analysis of nitrate, bacteria, and nitrogen isotope test results suggest a fertilizer source of contamination.

Additionally, recent and historical ground water monitoring indicate that nitrates have contaminated the source waters of two springs (Butler and Walker springs) within the BNPA. Elevated counts of total coliform bacteria have also, on occasion, been detected in the springs. Butler spring serves as the culinary water source for one of the local ranching operations.

The area has been designated as critical in terms of ground water nitrate contamination by the Idaho Department of Environmental Quality.

The geology in the area is mainly Quaternary basalts and sediments of the Idaho Group geologic formation. Underlying the Quaternary basalt are Tertiary sedimentary rocks of the Glens Ferry Formation and Tertiary Banbury Basalt, both of which are part of the Idaho Group (Garabedian, 1992). Well drillers logs show that shallow wells in the area are generally completed in the upper Quaternary basalts while deep wells are completed in the lower Banbury Basalt.

Well logs show that depth to ground water in the shallow aquifer ranges from approximately 15 to 85 feet below ground surface. Potential sources of recharge to this

shallow system include applied irrigation waters precipitation, and canal leakage. Potential sources for nitrate contamination of the ground water and springs include application of nitrogen based fertilizers, cattle manure, land applications of manure, wastewater lagoon, septic systems and crop residues.

Authorities

- The *Idaho Department of Environmental Quality (IDEQ)* is designated as the primary agency to coordinate and administer ground water quality protection programs for the state (Ground Water Quality Protection Act of 1989, Idaho Code 39-120).
- *Idaho Code 39-126* states “Cities, counties and other political subdivisions of the state shall incorporate the ground water quality protection plan in their programs and are also authorized and encouraged to implement ground water quality protection policies within their respective jurisdictions...”
- According to *Idaho Code 67-6537 (4) Local Land Use Planning*, when considering amending, repealing or adopting a comprehensive plan, the local governing board shall consider the effect the proposed amendment, repeal or adoption of the comprehensive plan would have on the source, quantity and quality of ground water in the area.
- The *Ground Water Quality Rule* (IDAPA 58.01.11.400.02 and IDAPA 58.01.11.400.03) sets forth a number of alternative actions that the IDEQ may follow when a numerical ground water quality standard has been exceeded, as well as when one has not been exceeded but significant degradation of the ground water has been detected. The ground water quality standard addressed in this plan is the primary (health based) drinking water standard of 10 mg/l nitrate.
- In March 2000, the *Policy for Addressing Degraded Ground Water Quality Areas* (Policy No. PM00-04) was published.
 - One of the purposes of this policy is to set forth a process to identify, designate, and delineate areas where ground water quality is significantly degraded as defined by rule.
 - Another purpose of *Policy Memo PM00-04* is to develop ground water quality management strategies for improving ground water quality in high priority areas based on current categorization and applicable standards with the use of local input. The Bliss stakeholder group used the managements strategies and standards developed in the policy to identify recommendations in this plan. The Gooding Soil Conservation District will act, proactively, in an advisory capacity, to improve local ground water quality through the adoption of this plan.
- The IDEQ formed the Ground Water Monitoring Technical Committee to compile the state’s ground water data. This committee is comprised of technical representatives

from local, state, and federal agencies and interested parties. In 2000, this committee delineated and identified twenty-five areas with elevated nitrate using ground water data collected through 1999. To be included on this list, 25% or more of the sample wells needed to exceed 5 mg/l of nitrate.

- The twenty-five nitrate priority areas were then ranked to determine the severity of the nitrate problem and to establish a work priority for agency resources. Ranking criteria consisted of population, existing water quality, water quality trends, and beneficial uses. The ranking list was finalized in December 2001. For more information, refer to the following web site: http://ww2.state.id.us/deq/water/gw/nitrate/nitrate_ranking.htm. The Bliss area was placed as #25 on this Nitrate Priority list.
- The Gooding Soil Conservation District, will be responsible for the overall coordination and implementation of this management plan in cooperation with local area residents and government agencies. The IDEQ is the lead agency assisting the Gooding Soil Conservation District and stakeholders in developing a management plan to address ground water degradation in the BNPA. Other agencies or groups providing technical support include:
 - Local growers/land owners
 - USDA Natural Resource Conservation Service
 - Idaho Soil Conservation Commission
 - Idaho Association of Soil Conservation Districts
 - University of Idaho Cooperative Extension Service

SECTION 2: MANAGEMENT PLAN GOALS

The primary goal of this management plan is to reduce the levels of nitrate-nitrogen (NO₃-N) in the BNPA ground water through education, demonstration, the voluntary implementation of Best Management Practices and:

- Conserve water to allow for future uses within the Middle Snake River Region.
- Improve profitability and quality of return from crop production.
- Increase monitoring and enforcement of non-point water quality standards on discharge to the aquifers and rivers of the region.

SECTION 3: MANAGEMENT PLAN APPROACH

This BNPA Management Plan is voluntary, based on the premise that the majority of growers and property owners, including dairy and CAFO operations, in the BNPA will be willing to improve and/or modify their management procedures and activities by

implementing BMPs to reduce nitrate loading to the ground water. It is the intent that voluntary implementation of this plan will reduce current nitrate levels in the ground water, provide economic advantages to land owners and growers and eventually remove the BNPA from the state list of areas degraded by nitrates.

If the voluntary approach results in satisfactory progress towards reducing nitrate levels in the ground water, mandatory requirements may not be necessary.

If ground water quality objectives are not met due to inadequate implementation of best management practices, best practical methods, or other corrective or preventive measures, then regulatory actions as authorized by law may be pursued as set forth in the Ground Water Quality Rule IDAPA 16.01.11.350.01 and 02.

Periodically, state and federal agencies will evaluate jointly, with participating entities, the progress and success of this management plan in reducing the nitrate levels in the BNPA. The Idaho Department of Environmental Quality (IDEQ) will provide oversight.

SECTION 4: MANAGEMENT PLAN OBJECTIVES

The primary objective of this management plan is to reduce nitrate loading to the ground water. By accomplishing this goal, through education and voluntary implementation of prescribed BMPs, the plan will also promote the following objectives:

- Improved surface water quality
- Improved water quality of domestic wells and springs
- Reduced nutrient and sediment loading of surface waters impacting the Mid-Snake River and its tributaries located within the BNPA.
- Reduced surface runoff and topsoil erosion
- Improved quality of return from crop production
- Conservation of irrigation water.
- Prevent increased costs to potable water consumers should additional treatment become necessary to meet current water quality standards.

SECTION 5: STRATEGIES FOR IMPLEMENTATION

The relatively shallow basalt aquifer in the BNPA is interbedded with clays, lava, and sands (ISDA, well logs), and is vulnerable to contamination. Nitrate nitrogen is highly mobile in the soil profile and contamination of this shallow aquifer can occur when the combined actions of applying nitrogen fertilizer in excess of crop needs in conjunction with inefficient irrigation practices allow for the leaching of nitrates (and other potential contaminants) below the root zone where it is unavailable to the crop. The leaching of nitrates to ground water is influenced not only by the amount of nitrogen applied but in the form in which it is applied, the timing and method of application and irrigation management practices used.

Implementation of this plan will focus on specific BMPs as identified in the 319 Project “Bliss Nitrate Priority Area Best Management Practice Demonstration Project”. Implementation of BMPs directed at nutrient and irrigation water management will be the focal point of this plan and will include:

1. Implementation of irrigation water management strategies that are crop specific, maximize plant utilization of applied nitrogen, prevent leaching of nitrates below the root zone, maximize yield and conserve water resources.
2. Implementation of nutrient and soil fertility management plans that will match crop usage of nutrients with application of chemical fertilizer, animal waste and agricultural solid waste to prevent nitrogen inputs that exceed plant uptake.
3. Provide educational programs that will promote the adoption of efficient and cost effective nutrient, soil fertility and irrigation water management and crop rotation practices.
4. Insure compliance of regulated dairy and CAFO operations within the BNPA.

SECTION 6: PROBLEMS AND RECOMMENDATIONS

Table #1

Problem	Recommendation
Inefficient Management of Irrigation Water (100% of current participants are on sprinklers)	<ol style="list-style-type: none"> 1. Provide educational programs on proper irrigation scheduling, soil water holding capacity and consumptive use. 2. Encourage the installation of water saving devices such as soil moisture sensors and additional monitoring by crop weather stations and feed back systems. 3. Match irrigation applications more closely to evapotranspiration based on specific crops and soil types.
Inefficient Nutrient and Soil Fertilizer Management	<ol style="list-style-type: none"> 1. Match animal waste, agricultural solid waste and chemical fertilizer application with crop usage of nutrients. 2. Determine fertilizer usage based upon crop demands. 3. Time fertilization to coincide with specific crop nutrient uptake characteristics. 4. Promote crop rotations that maximize utilization of residual nutrient.
Dairy and CAFO Nutrient Management Plans (efficient? Implemented?)	Determine if established criteria are achieved and if existing BMPs are adequate as designed, installed and maintained, including lagoons and wastewater ponds.

SECTION 7: IMPLEMENTATION TASKS

The Gooding Soil Conservation District will act as overall coordinator, in cooperation with other stakeholders, to encourage adoption of this plan and implementation of BMPs identified in the “Bliss Nitrate Priority Area 319 BMP Project”. The table #2 below describes the specific tasks and identifies the responsible agency/entity and the time frame.

Table #2

IMPLEMENTATION TASK	AGENCY	TIME FRAME
Irrigation management <ul style="list-style-type: none"> Implement Irrigation Management Plan BMPs and recommendations with participating growers/land owners, as developed in the BNPA 319 demonstration Project. Monitor ground water simultaneous with and following installation of nutrient management and irrigation water management BMPs. Over-site of chemigation practices 	ISDA, Gooding SCD, NRCS, SCC, U of I Gooding SCD, ISDA, SCC, NRCS ISDA	2007 2007 Ongoing 2007 ongoing
Nutrient management <ul style="list-style-type: none"> Implement Nutrient Management Plan BMPs and recommendations with participating growers/land owners, as developed in the BNPA 319 demonstration Project. Evaluate nutrient and irrigation input records with ground water quality to gauge effectiveness of BMPs in reducing nitrogen loading. Evaluate bi-annually and adjust implementation practices as needed. Promote nutrient management planning for third party applicators of dairy and CAFO waste. 	ISDA, SCD, NRCS, SCC ISDA, Gooding SCD, NRCS, SCC U of I Gooding SCD ISDA	2007 Ongoing 2007 ongoing
Dairies and CAFOS <ul style="list-style-type: none"> Review nutrient management plans to evaluate plan adequacy. Request on-site inspections and compliance documents to determine if nutrient management plans and BMPs are being implemented. 	ISDA, DEQ ISDA, DEQ, Gooding SCD	2007 Ongoing 2007 Ongoing
Monitoring <ul style="list-style-type: none"> Install data loggers to continuously monitor Butler and Walker springs to log any spikes in N and help determine source. Install monitoring wells on northern edge of study area and establish monitoring program. Monitor Walker and Butler spring for other 	ISDA, SCD, DEQ ISDA, SCD ISDA, SCD, DEQ	2007 Ongoing 2007 2007

agricultural contaminants as needed . <ul style="list-style-type: none"> • Locate any improperly abandoned wells within the BNPA and seek funding to abandon them to IDWR standards. 	DEQ, IDWR, SCD	2007
Education <ul style="list-style-type: none"> • Provide educational materials and/or seminars to local growers/land owners on the benefits of nutrient and irrigation management planning. • Promote and provide educational materials on Source Water/Wellhead Protection to residents who utilize ground water or springs as their source of culinary water. Hold public meetings and/or provide progress reports for both participating and non-participating growers (annually, at a minimum or as results are documented) within the BNPA. • Provide local residents with information on proper maintenance and upkeep of individual subsurface septic systems. • Promote adoption of BMPs to other growers/land owners within the BNPA. 	ISDA, SCD U of I ISDA, SCD, DEQ SCDH, DEQ	2007 Ongoing 2007 Ongoing 2007 Ongoing
General <ul style="list-style-type: none"> • Provide copies of final plan to Gooding County Commission for approval and adoption. • Provide copies to Gooding Soil Conservation District Board members and other local decision makers. 	DEQ,SCD DEQ, SCD	2007 2007

SECTION 8: EVALUATION OF MANAGEMENT PLAN PROGRESS AND SUCCESS

The primary goal of this plan is to reduce nitrate contamination of the aquifer to the extent that the area can be removed from the statewide nitrate priority list. However, due to the slow nature of ground water movement, it is not anticipated that quantitative reductions in nitrate levels will occur during the early implementation of this plan. Therefore, qualitative measures will also be established to evaluate the progress and success of the plan in the short term (3 -5 years). Once the plan is in place and is being implemented, the following activities will occur to evaluate the progress made in reducing nitrate contamination of the ground water.

- Agencies and other stakeholders will meet twice a year to review implementation activities that have occurred and evaluate available monitoring results.
- Agencies and other stakeholders will evaluate Plan effectiveness and modify as needed.

A collection of findings from federal, state, and local agencies will be compiled twice a year. The Gooding Soil Conservation District with the support of the stakeholders, will be the lead entity to compile and distribute this information. The first review will be scheduled for Spring 2007.

The qualitative evaluation will assess whether the appropriate institutions promoted the plan recommendations, and will include the documentation of activities, practices and alternatives that have been adopted to reduce nitrate loading to the ground water. This evaluation will also consider whether the protection strategies are still being promoted and what percentage of businesses, operators and other organizations are participating in the plan.

SECTION 9: RESPONSIBILITIES

- **Project promotion, administrative support and project management** – Gooding Soil Conservation District, project management.
- **Engineering and nutrient management plan development** – Idaho Soil Conservation Commission and the University of Idaho, Twin Falls Research and Extension Center.
- **Irrigation water management plan development** – Idaho State Department of Agriculture and the University of Idaho, Twin Falls Research and Extension Center .
- **Monitoring, data management and reporting** - Idaho State Department of Agriculture, Gooding Soil Conservation District and the University of Idaho, Twin Falls Research and Extension Center.
- **Project management** - Idaho State Department of Agriculture, Idaho Soil Conservation Commission and the Gooding Soil Conservation District.
- **Plan oversight** – Idaho Department of Environmental Quality.
- **Plan progress, evaluation...**All parties.